disco tech T.M.

# DDT T.M.

# Disc Drive Timer

## *a computer program for APPLE II / Applesoft BASIC*

Analyze and adjust
your disc drive motor speed
with real-time graphic display.

*All you need is DDT,
two screwdrivers, and five minutes' time.*

***For 32K Apple II,
16K Apple II Plus
and UCSD Apple Pascal.***

***DOS 3.1 - 3.2,
and DOS 3.3.***

## instruction manual

**Disco-Tech** T.M.
microcomputer products
a division of
Morton Technologies, Inc.
P.O. Box 11129, Santa Rosa, Ca. 95406

INSTRUCTION MANUAL

# DDT T.M.
# Disc Drive Timer

## FOR 32K APPLE II, 16K APPLE II PLUS, AND APPLE UCSD PASCAL

*DISCO-TECH's DDT is also available in a TRS-80 version.*

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disco tech T.M.
microcomputer products
a division of
Morton Technologies, Inc.

1150 Coddingtown Center ● Santa Rosa, California 95406
Post Office Box 11129 ● 707/523-1600 or 527-8500

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# DDT™

# Disc Drive Timer

A COMPUTER PROGRAM
FOR APPLE II / APPLESOFT BASIC

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# DDT - DISCO-TECH's Disc Drive Timer

## INTRODUCTION

DISCO-TECH's DDT (Disc Drive Timer) is an easy-to-use, versatile tool to keep your disc drive motors running at proper speed. Incorrect motor speed can cause data to be lost when you load programs or when you're saving them. Running fast or slow also results in incompatibility between programs created on slow- or fast-running disc drives and programs developed on disc drives running at the correct speed.

DDT displays disc drive motor speed in two ways. First, it gives you an extremely accurate motor speed analysis; second, it provides a real time graphic display.

DDT's motor speed analysis gives you both the motor speed in RPM and the percentage of error from the correct speed of 300 RPM.

The graphic display lets you adjust motor speed simply and quickly. It's a lot easier than using the strobes on your disc drives.

Another important point: Using DDT to adjust your disc drives doesn't require you to do anything which will void your Apple warranty.

DDT will run only on the diskette supplied by DISCO-TECH. This diskette contains special timing information on three of its tracks. DO NOT COPY any other programs onto your DDT diskette. If you try, you may damage that timing information.

*(more)*

DDT will run on a minimum 32K Integer BASIC Apple II, 16K Apple II Plus, or a 16K machine when Apple Pascal is used with an Apple II or Apple II Plus.

The Apple version of DDT contains three copies of the program on the diskette: DDT.BAS, DDT1.BAS, and DDT2.BAS. If your original copy of DDT is damaged, replace it with one of the duplicate programs on your DDT diskette. Delete the file called "DDT.BAS" and assign that name to either "DDT1.BAS" or "DDT2.BAS".

DISCO-TECH's DDT program is also available for the TRS-80 computer.

This manual doesn't presuppose a lot of technical knowledge on your part. You'll have to know enough about the Apple to run programs from disc; and you'll need enough mechanical know-how to operate a screwdriver. That's all.

How often you run DDT is up to you. We recommend that you use DDT whenever you get a new disc drive -- and whenever you transport your disc drives. The jostling a disc drive receives during shipping frequently knocks off motor speed slightly. One of the disc drives we bought arrived with a motor speed of 280 RPM instead of the required 300 RPM. It was useless and dangerous to data and had to be returned for exchange. That was before we developed DDT.

In general, if you're not moving your disc drives from one place to another, a once-a-month checkup and adjustment is probably quite adequate.

This manual includes sections on running the DDT program and adjusting disc drive motor speed.

*(more)*

You need only three tools -- the DISCO-TECH DDT program a Phillips-head screwdriver to remove the disc drive cover, and a small standard screwdriver to adjust the drive itself.

*(end)*

## DISCO-TECH DDT Program/Apple Version

### RUNNING THE PROGRAM

The DISCO-TECH DDT Program is composed of four specific functions:

O -- Analyze motor speed of one disc drive.
G -- Graphic display of motor speed of one disc drive
X -- Exit from this program.
L -- Display this list.

Follow this procedure to adjust disc drive motor speed:

1) Analyze each of your disc drives, using the "O" function to discover the actual motor speed of each of them. This will tell you if the speed of any individual drive is off by more than 3 RPM from the correct speed, 300 RPM. If it's off by more than 3 RPM, remove the cover of the drive and
2) use the graphic display, the "G" function, to monitor the motor speed as you adjust the drive.
3) After you've adjusted the motor speed, check your adjustment. Analyze just that one drive, using the "O" function. When you've adjusted the speed appropriately, replace the cover. Repeat this procedure, adjusting each drive and checking its speed, until all of your disc drives have been adjusted and the speed checks out in each of them.
4) You may then end the program, using the "X" function.

Start up the computer with the DDT diskette in Drive 1, Slot 6.* The program will load off the diskette and begin to run. An initial display which consists of the program title, Morton Technologies, Inc., copyright information, etc. will appear on the video screen; and then the following display will appear:

```
        ****  DISCO-TECH (TM) DDT  ****


     L I S T   O F   F U N C T I O N S

   O -- ANALYZE MOTOR SPEED OF A DISC
          DRIVE
   G -- GRAPHIC DISPLAY OF MOTOR SPEED
          OF A DISK DRIVE
   X -- EXIT FROM THIS PROGRAM
   L -- DISPLAY THIS LIST


   FUNCTION (TYPE 'L' FOR A LIST) -
```

Now you may choose which program function you want to use. Simply type in the letter which corresponds to the function you wish to employ.

*See the text which starts on the next page for a description of each function.*

---

* ***NOTE:*** *If you have a Pascal or DOS 3.3 system, you'll need to start up the computer with the Basics: disc in the drive; then place your DDT diskette in the drive and press the RETURN key.*

## ANALYZE ONE DRIVE (FUNCTION "O")

Function "O" will analyze one of the disc drives in your system. It will display on the video screen the motor speed in RPM and the percentage of error, plus or minus, from the correct speed of 300 RPM for each drive.

Make sure that your DDT diskette has been inserted into the disc drive you wish to analyze. You'll get an inaccurate drive speed analysis if you use any diskette other than the one supplied by DISCO-TECH.

When you choose the "O" function, the DDT program asks for the slot number of the disc drive you wish to analyze. Check to see which slot your disc controller card is plugged into (usually Slot 6); then type that number into the computer. After that, the program will ask you for the drive number. Type that number into the computer

The program ascertains that the drive number is valid (1-2) and that the drive is ready (drive connected, drive on, diskette inserted, and door closed securely). If any of these conditions is not affirmative, the program will ask you to re-enter the drive number.

If you press "L" in response to the program's request for either the slot number or the drive number, the program will terminate the "O" function and will display the function list again.

The DDT program analyzes a disc drive's motor speed by taking the average speed over 40 revolutions. An analysis requires about 12 seconds. When it's completed, the following display will appear on the video screen:

*(more)*

```
          ****  DISCO-TECH (TM) DDT   ****



      DRIVE 1  --  TOO FAST
      SPEED (RPM)..........  300.7
      ERROR FROM 300 RPM...%     .2




        FUNCTION (TYPE 'L' FOR A LIST) -
```

If the disc drive is off more than three RPM from 300 RPM, it's best that you adjust the motor speed in that drive. When Function "O" is completed, a prompt, "FUNCTION (TYPE 'L' FOR A LIST)" will appear at the bottom of the screen. You may enter another function.

## GRAPHIC MOTOR SPEED DISPLAY (FUNCTION "G")

Function "G" displays a scale at the bottom of the screen. A graphic block indicates motor speed. The indicator (blip) is updated approximately once per second.

Make sure that your DDT diskette has been inserted into the disc drive you wish to analyze. You'll get an inaccurate drive speed analysis if you use any diskette other than the one supplied by DISCO-TECH.

When you choose the "G" function, the DDT program asks for the slot number of the disc drive you wish to analyze. Check to see which slot your disc controller card is plugged into (usually Slot 6); then type that number into the computer. After that, the program will ask you for the drive number. Type the drive number into the computer.

*(more)*

**The program ascertains that the drive number is valid (1-2) and that the drive is ready (drive connected, drive on, diskette inserted, and door closed securely). If any of these conditions is not affirmative, the program will ask you to re-enter the drive number.**

**The program also asks for an RPM range. The RPM range is the range of motor speeds on either side of 300 RPM which will be displayed on the video screen. The display is 40 units wide, so it's best to use multiples of two in the range you choose. That way, the units are composed of convenient whole or simple fraction values. In deciding which range to use, ascertain the number of RPMs by which your drive is off from 300 RPM, double that number, and then choose a multiple of two which is greater than that value. The narrowest range which can be specified is one RPM. If you enter an invalid range (less than one), the program will ask you to re-enter the range.**

**If you press "L" for any of the three entries for the "G" function, the "G" function will terminate and the Function List will be displayed again on the video screen.**

*(more)*

**The disc drive will start up and a blip, indicating motor speed, will appear on the video screen. If the blip remains at one side of the screen or the other, then the RPM range you specified was too narrow. In this case, you should exit the function by pressing "G" to choose Function "G" again, and specify a wider range. On the other hand, if the blip is very close to the center of the scale, the range is too wide; and it's necessary to specify a narrower range, if you're not already using a range of one RPM.**

**You'll notice that the blip jumps around somewhat on the screen. That's because the disc drive motor speed fluctuates slightly. It's normal, too, for the blip to float higher on the scale as the drive is left running. Disc drive motors speed up slightly as they run.**

**If the display indicates that it's necessary to adjust motor speed, refer to the section "Adjusting Disc Drive Motor Speed" in this manual.**

**When you want to exit from the graphic display, simply press any key and the Function List will be displayed on the video screen; or you may choose the next function by pressing the key which corresponds to that function.**

## EXIT PROGRAM (FUNCTION "X")

**Function "X" is used to exit from the DDT program.**

## DISPLAY FUNCTION LIST (FUNCTION "L")

**Function "L" displays the function list, if you need to see it, at the end of Function "O".**

*(end)*

# ADJUSTING DISC DRIVE MOTOR SPEED

If you're using this section, we assume that you've discovered that one of your disc drives is operating at an incorrect motor speed. We'll assume, too, that you're using Function "G" with a proper range to display the motor speed.

Adjusting motor speed involves only three simple steps: remove the disc drive cover; adjust a single screw until the speed is correct; and replace the cover.

The following instructions describe how to adjust disc drive motor speed for your Apple disc drives.

## STEP 1 - REMOVE DISC DRIVE COVER

Use a Phillips screwdriver to remove the screws which secure the cover. Remove the four screws from the bottom of the drive. Slide the cover backward off the back of the drive. If you meet resistance, the sheet of plastic which covers the vents is probably jamming the cover. Slide the cover as far forward as it will go, locate the piece of plastic, press it back against the case, and slide the cover off the back.

## STEP 2 - LOCATE MOTOR SPEED ADJUSTMENT SCREW

What you're looking for is a trim-pot. The trim-pot is a small gray box which has a small adjustment screw located on one end. You'll find it on the small circuit board at rear of the drive. The screw on the trimpot faces outward on the right side of the drive.

*(more)*

## STEP 3 - ADJUST THE MOTOR SPEED

Start turning the adjustment screw slowly with your small screwdriver. Turn it gently in both directions. Watch the indicator blip on the video screen. If the blip moves away from the center of the scale, you are turning the screw the wrong way. You'll know you're adjusting the screw in the right direction when the blip moves toward the center of the scale.

Trim-pots don't always operate smoothly. As you adjust the screw, the motor speed may jump considerably and then return to where it was in the beginning. Or you may find a spot where the speed jumps around erratically. If these things occur, just keep turning the screw until you get past the inaccurate part.

Continue to adjust the screw until the blip is near the center of the scale on the video screen. If you're not already using an RPM range of one, press "G" to choose Function "G" again. This time, specify a narrower range. Keep adjusting the screw until the blip is as close to 300 RPM (the center of the scale) as you can get it. When you're using a range of one, the scale is so sensitive that the indicator will jump around by several notches on the scale as the motor speed fluctuates even slightly.

Now, exit from the graphic display and do an analysis of the drive you've just adjusted, using Function "O". It should now be within a few tenths of one RPM of 300 RPM.

*(more)*

### STEP 4 - REPLACE THE COVER

Put the cover back on the disc drive. Slide the cover over the back; then slide it forward. Be sure that the vents are at the back of the drive. Save yourself trouble in future and use as few screws as possible to secure the cover. It'll make it a lot easier to remove the cover next time.

We've observed that motor speed drifts somewhat over a period of time as the disc drive is used. It will be slower when the drive is first turned on, increasing in speed as the drive runs for awhile. This variation is normal and doesn't affect the operation of the drive; so you don't need to adjust drive speed constantly. The drive will operate optimally when its speed is within 3 RPM of 300 RPM, plus or minus.

If you have an early disc drive (e.g., one with a serial number of 1800, compared with one, say, with a serial number of 6000-7000), the trimpot screw doesn't face to the side; it faces *down*. You have to remove four more Phillips screws in order to reach the adjustment screw. Then you need to place the disc drive in such a way that the trimpot screw overhangs the edge of the table. Now you can adjust the disc drive's speed while the drive is in a normal position.

## CARE OF MAGNETIC MEDIA

**Magnetic media, diskettes and cassettes, are all-too-easy to erase. The magnet in any loudspeaker (in cassette recorders, portable radios, TV sets, etc.) can wipe out all or part of the data. The power supply of your microcomputer is even more deadly. So be sure to keep your diskettes a respectful distance from your Apple power supply. NEVER put them on top of the video screen, where electromagnetic fields will almost certainly steal away your data. Beware of magnetized tools, scissors, paperweights, fixtures, etc. BE SUSPICIOUS of anything made of steel. Treat your diskettes and cassettes with the care which these valuable tools deserve.**

**TEMPERATURE AND HUMIDITY. Magnetic media are sensitive to extremes of temperature and humidity. Store them in an area where the temperature is sure to stay within 50°F. and 125°F. (10°C. and 52°C.). Relative humidity should be no less than 8% nor greater than 80%.**

**KEEP 'EM CLEAN. Never touch the tape or the surface of a diskette. The oil from your skin can ruin them. Avoid dusty areas. Rewind cassettes before you remove them from the recorder; and store them in dust-proof cases. Keep your diskettes in their envelopes or in the disc-jacket, when their not actually in the disc drive. They're a lot easier to find; they stay in much better condition; and you'll eliminate a lot of loss and damage.**

**A common accident occurs when someone puts a data cassette into a player-recorder and then accidentally presses the RECORD button. You can prevent this by punching out the tabs in the back of the cassette. Then it can't be recorded over.**

*(more)*

Another way to lose data is to switch a disc drive on or off while there's a diskette in the drive. If you're lucky, you won't erase it. But sometimes you'll wipe out part of the data on your diskette.

## DO'S AND DON'TS OF FLOPPY DISC HANDLING AND STORAGE

1) DON'T touch the disc surface. It's easily-contaminated, which causes errors.
2) DON'T use solutions (alcohol, thinner, Freon) to clean the disc.
3) DON'T use magnets or magnetized objects near the disc. A magnetic field can wipe out your data.
4) DON'T bend or fold the disc.
5) DON'T place heavy objects on the disc.
6) DON'T use rubber bands or paper clips on the disc.
7) DON'T write on a disc with a pencil or ballpoint pen. Use a fiber-tip marker.
8) DON'T use erasers on a disc.
9) DON'T expose the disc to excessive heat or sunlight.
10) Insert the diskette into the drive CAREFULLY. Grasp its upper edge and place it in the drive. Don't force it.
11) Keep the disc in its envelope or disc-jacket.
12) Store discs which won't be used immediately in their box and keep the box upright.
13) Operating environment: 50°F. to 122°F. (10°C. to 50°C.); 20% to 80% RH; less than 29°C. (wet bulb temperature).
14) Storage environment: 40°F. to 127°F. (4°C. to 53°C.); 8% to 80% RH.
15) Transportation: When transporting diskettes, keep them in their envelope and in a protective box. Temperature range: -40°F. to 127°F. (-40°C. to 53°C.). Relative humidity: 8% to 90% RH.

## REPLACEMENTS FOR DISCO-TECH SOFTWARE

If you need a replacement for any DISCO-TECH software product, we will replace without charge any of our diskettes or cassettes which prove to be defective because of materials or workmanship. Just mail your defective diskette or cassette, with a brief letter stating the problem,

to us at this address:

DISCO-TECH REPLACEMENTS
P.O. Box 11129
Santa Rosa, California 95406

If, on the other hand, your DISCO-TECH media suffer damage from faulty equipment or mishandling, DISCO-TECH will replace it for a nominal $8 handling fee. Simply mail the damaged item to us at the above address with your check or postal money order for $8.00. Be sure to include your return address.

Only DISCO-TECH diskettes or cassettes will be replaced and the item must be identifiable as a DISCO-TECH product. Replacement will not be made if the enclosing case has been opened or tampered with.

Replacements will be made with stock currently on hand, which may be a later version of the program you purchased originally. If the revised version of your program is priced higher than the original version, you will be billed for the difference before shipment.

*(End of "Care of Magnetic Media")*

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# Disc Drive Timer

## *a computer program for APPLE II / Applesoft BASIC*

analyze and adjust your disc drive
motor speed with real-time graphic display.

## DDT T.M.
### Disc Drive Timer
**for Apple Microcomputers**

Analyze and adjust
your disc drive motor speed
with real-time graphic display.

*All you need is DDT, two screwdrivers, and five minutes' time.*

Once you get it, you'll wonder how you ever managed without DDT.

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Get the bugs out of your disc drives with DDT, DISCO-TECH's brand-new program which lets you analyze and adjust disc drive motor speed within a tenth of an RPM (in a total 300) with a real-time graphic display. All you need is DDT, two screwdrivers, and five minutes' time. No more down time and costly repairs. DDT is faster, easier, and more accurate than strobe timing. Incorrect motor speed causes lost data and program incompatibility. DDT lets you check disc drive motor speed *routinely* with a detailed motor speed analysis, so your drives are always running right.